

CLAIMS:

1. An apparatus for loading a medical device into a catheter delivery system, the apparatus constructed and arranged to matingly engage a crimping apparatus for
5 reducing the diameter of said medical device from a first diameter to a second diameter prior to loading said medical device into said catheter delivery system.
2. The apparatus of claim 1, said apparatus having an alignment plug with an external taper for matingly engaging said crimping apparatus.
3. The apparatus of claim 2 in combination with a crimping apparatus having an
10 actuation hub with an internal taper, said internal taper matingly engaging said external taper of said alignment plug.
5. The apparatus of claim 1 further comprising an introducer shaft.
6. The apparatus of claim 5 wherein said introducer shaft has an outer triangular configuration.
- 15 7. The apparatus of claim 5 wherein said introducer shaft further comprises an introducer plug having a lumen through which the medical device is introduced.
8. The apparatus of claim 7 wherein said lumen of said introducer plug tapers from an opening having a larger diameter at the opening of the introducer shaft to an opening having a smaller diameter for engaging an outer catheter shaft within said introducer
20 shaft.
9. The apparatus of claim 8 wherein said introducer plug has a length which is slightly less than the length of a stent strut.
10. The apparatus of claim 7 wherein said introducer plug is modular with said introducer shaft.
- 25 11. The apparatus of claim 7 wherein said introducer plug has conical flanged edges extending from said opening for engaging an outer catheter shaft.
12. The apparatus of claim 7 wherein said introducer plug has flat edges at said opening for engaging an outer catheter shaft within said introducer shaft.
13. A crimping apparatus for reducing the diameter of a medical device from a first
30 diameter to a second diameter, the apparatus constructed and arranged to matingly engage a loading apparatus for introducing said medical device into a catheter delivery system.
14. The apparatus of claim 13, said apparatus having an actuation hub, said actuation hub having an internal taper for matingly engaging a loading apparatus.

15. The apparatus of claim 14 in combination with a loading apparatus, said loading apparatus having a plug with an external taper for matingly engaging said actuation hub of said crimping apparatus.
16. The apparatus of claim 13 comprising at least three coupled, movable blades
5 which form an aperture whose size may be varied.
17. In combination, a crimping apparatus for reducing the diameter of a medical device from a first diameter to a second diameter and a loading apparatus for introducing said medical device into a catheter delivery system, said crimping apparatus constructed and arranged to matingly engage said loading apparatus and said loading apparatus
10 constructed and arranged to matingly engage said crimping apparatus.
18. The combination of claim 17 wherein said crimping apparatus has an actuation hub having an internal taper and said loading apparatus having an alignment plug having an external taper for matingly engaging said actuation hub of said crimping apparatus.
19. The combination of claim 17 wherein said loading apparatus further comprises
15 an introducer shaft.
20. The combination of claim 19 wherein said introducer shaft has an external triangular configuration.
21. The combination of claim 20, said introducer shaft further comprising an introducer plug.
- 20 22. The combination of claim 19, said introducer plug having a lumen tapering from a first opening having a larger diameter adjacent the opening of the introducer shaft through which a medical device is introduced and a second opening having a smaller diameter for engaging an outer catheter shaft within said introducer shaft.
23. The introducer plug of claim 22 wherein said first opening has a diameter which
25 is slightly larger than an aperture of a crimping apparatus which has been sized to receive a stent therein.
24. The introducer plug of claim 22 wherein said second opening has a diameter which is slightly larger than the diameter of an outer catheter shaft.
25. The combination of claim 21 wherein said introducer plug has a length which is
30 slightly less than the length of a stent strut.
26. An apparatus for reducing the diameter of a medical device from a first diameter to a second diameter, the apparatus comprising at least three coupled, movable blades which form an aperture whose size may be varied, wherein at least one of said blades

further comprises a tool for matingly engaging an apparatus for loading said medical device into a catheter delivery system.

27. The apparatus of claim 26 wherein said tool is a conical flange adjacent the edge of said at least one of said blades.

5 28. The apparatus of claim 26 wherein said tool is integral with at least one of said blades.

29. The apparatus of claim 26 wherein each of said blades has a tool which is integral with the blade.

30. The apparatus of claim 26 wherein said tool is modular to at least one of said
10 blades.

31. The apparatus of claim 26 wherein each of said blades has a modular tool.

32. The apparatus of claim 26 wherein said tool is modular with all of said blades.

33. The apparatus of claim 26 wherein said at least one tool is attached to at least one of said blades mechanically.

15 34. The apparatus of claim 33 wherein said at least one tool is attached to at least one of said blades with a screw, thread, weld or adhesively.

35. The apparatus of claim 26 wherein said at least one tool is polymeric, metallic or a combination thereof.

36. The apparatus of claim 26 wherein said at least one tool is formed from the same
20 material as said blades.

37. The apparatus of claim 26 wherein said at least one tool is formed from at least one polymeric material selected from the group consisting of polyolefins, polyamides, polyesters, polyurethanes, polyacetals, polycarbonate, copolymers thereof and mixtures thereof.

25 38. The apparatus of claim 37 wherein said at least one polymeric material is selected from the group consisting of nylon, polyethylene terephthalate, polybutylene terephthalate, acetal homopolymers, polyetherether ketone, and mixtures thereof.

39. The apparatus of claim 26 wherein said at least one tool is formed from at least one metal selected from the group consisting of copper, cobalt, stainless steel, steel,
30 aluminum, and alloys thereof.

40. The apparatus of claim 39 further comprising a coating which reduces the coefficient of friction.

41. The apparatus of claim 40 wherein said coating comprises polytetrafluoroethylene.

42. The apparatus of claim 26 wherein said at least one tool is formed from ceramic.
43. The apparatus of claim 26 wherein said medical device is a stent.
44. An apparatus for crimping a medical device, the apparatus constructed and arranged for self-alignment with an apparatus for loading said medical device into a catheter delivery system.
45. A method of crimping a medical device and loading the medical device into an external shaft of a catheter delivery device, the method comprising the steps of:
- a) providing a crimping apparatus, said crimping apparatus having an actuation hub for matingly engaging a loading apparatus;
 - b) placing the medical device into the crimping apparatus;
 - c) applying a radial inward force while said medical device is in said crimping apparatus such that the diameter of said medical device is reduced from a first diameter to a second diameter;
 - d) providing a loading apparatus, said loading apparatus having a plug for matingly engaging said crimping apparatus;
 - e) mating said crimping apparatus with said loading apparatus; and
 - f) transporting said medical device from said crimping apparatus to said loading apparatus.
46. The method of claim 45 wherein said medical device is transported using forced air.
47. The method of claim 45 wherein said medical device is transported from said crimping apparatus to said loading apparatus through an introducer shaft having an introducer plug, said plug having an internal taper from a larger opening closest to said crimping device to a smaller opening adjacent to said catheter delivery assembly.
48. The method of claim 47 wherein said crimping apparatus has an aperture whose opening is slightly smaller diameter than the opening of the introducer plug closest to said crimping apparatus.
49. The method of claim 47 wherein said opening of said introducer plug adjacent said distal end of said catheter delivery assembly has a diameter which is slightly larger than said opening of said distal outer catheter shaft adjacent to said introducer plug.